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Social Connection in Numbers

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Abstract

Humans ascribe value to all objects that they handle or attend to, but the mechanisms that underlie this process are not entirely clear. Past research has shown that the valuation process is affected by an object's social connections and standing. Current research suggests that there is a law of contagion in effect, meaning that when a source individual interacts with an object, some of his or her 'essence' rubs off on the object, which then plays a role in how future individuals value the object. This current study focuses on this essence, and how it may be quantifiable or additive: if one person interacting with an object increases its perceived value, then does one hundred people interacting with an object increase its perceived value even more? Additionally, if participants consciously evaluate and ascribe a value to an object, does that affect their perceived value of an object, when compared with participants who handle an object without consciously evaluating its qualities and worth? This study showed that social connections are additive, with participants who believed 2 others had previously interacted with the object having a lower value of it than participants who believed 202 others had previously interacted with it. It also showed that task had no effect on valuation, so participants who consciously evaluated and valued an object did not value it any more or less than participants who did not consciously evaluate it. Therefore, this study hints at some of the possible mechanisms underlying both the law of contagion and the process of valuation in humans, shows how humans may perceive an object's social connections, and how much of valuation may be an unconscious process.

Keywords: valuation, social connection, contagion

Introduction

As humans, we confer a value onto almost every object that we handle. In some cases, this valuation process can be quite clear; for example, the value given to dollar bills or important devices like cell phones. However, this valuation process is more difficult to delineate when it comes to objects which have a value that depends on its social connection and qualities, and relies on many unknown processes, mechanisms, and variables. The valuation of these social objects has been described as a form "sympathetic magic" inherent to human nature, evidenced by its presence in most all "traditional societies" and how it has persisted in modern cultures to this day (Rozin et al., 1989; Nemeroff & Rozin, 1994). The term sympathetic magic originates from when it was interpreted and believed to be a form of actual magic, centering around the use of objects with some symbolic or social connection. A well-known example of this 'magic' in popular culture is the concept of 'voodoo dolls', in which an object shares its state with an individual through a connection based off of physical similarities and shared traits. The central principles of sympathetic magic, the laws of contagion and similarity, had thus been described long before they were drafted into the scientific process (Frazer, 1890). This magic has been previously investigated to uncover the processes that underlie it, and while some of the variables have been identified, still others remain unknown. This current study investigates this valuation process in how an object's value can be influenced by both its social history and the circumstances under which it is encountered.

When this form of magical thinking was first described in the late 1800s, anthropologists laid out two laws that delineated how and why it worked and where this social value of objects stemmed from: the law of contagion, and the law of similarity (Frazer, 1890; Mauss, 1902; Taylor, 1871). The law of contagion describes, as its name suggests, how the 'essence' of a

source individual can be transferred to a recipient object just by the individual handling it. The law of similarity, on the other hand, describes how an image of an object can share some state of being with the object itself; that is, an action done onto the image is, in some way, done onto the original object. The law of similarity can be easily understood by looking at it under the idea of actual sympathetic magic, where these laws were first described in, with the concept of 'voodoo dolls'; an act inflicted upon the image is thought to be inflicted on the original. The law of contagion, first examined in how it leads to the spread of diseases (Nemeroff & Rozin, 1994), has been investigated before due to its potential for usage in commercialization and consumerism. For example, the law of contagion has been examined in how celebrity testimonials can be used in advertising, selling a product based off its tenuous connection with a famous name and face (Argo, Dahl, & Morales, 2006; Newman, Diesendruck, & Bloom, 2011).

These laws also parallel with two laws of association, contiguity and similarity, which describe how humans come to mentally associate one object with another, and is more well understood than valuation (Hall, 1994). This suggests a link between how the processes of association and valuation work, and a possible way of investigating the valuation process's mechanisms.

Evidence of these laws, which underlie how adults think, has also been seen in children as young as three (Gelman, Manczak, & Noles, 2012; Gelman et al., 2016). Under Piaget's stages of childhood development, infants are born in the sensorimotor stage, before conscious processing, in which sensory processing is developed. Object permanence is obtained in this stage. At around two years old, infants then transition into the preoperational stage, in which their brains start to become capable of mentally representing the world and creating mental representations of objects. At this stage, children develop theory of mind, and become more

likely to identify objects as how they relate to the owner, instead of mere physical features (Gelman, Noles, & Stilwell, 2014). This gives further evidence and support to the law of contagion; if this law is one of the guidelines for how humans think, it is expected young children would begin to judge the objects they attend to by their social connections.

Studies have also looked closer at the possible mechanisms underlying the laws of contagion and similarity and the resulting valuation process. Concerning the law of similarity, experiments have been performed to examine how these mechanisms might change depending on the direction of the affect: either forwards, with action done on the original affecting the image, or backwards, from the image to the original (Rozin et al., 1989; Nemeroff & Rozin, 1994). Experiments into the law of contagion, on the other hand, have focused on the nature of the source individual, either positive or negative, and the type of transfer, either biological or social (Rozin et al., 1989; Nemeroff & Rozin, 1994). More recently, studies have shown how the "need to belong" in an individual can affect the valuation process and essence transfer, with higher valuation of the contagioned object from individuals with a higher need to belong (Newman & Smith, 2016). This current study focuses more on these mechanisms, examining what factors might affect the valuation process and how to increase or decrease the value given to a social object.

Most closely related to this current study, however, are the findings that a social object's history with generic or unknown humans can also trigger the essence transfer in the valuation process. While it has already been shown that celebrities or other well-known figures can trigger this, Job et al. (2017) showed that a strongly valenced individual is not required for the value transfer, as unknown individuals also trigger it. This was shown across three different experiments, in which valuation was measured by how much participants would be willing to

pay for an object and how much they believed it was “worth”, and how “upset” they would be if the object was destroyed, measured on a 7-point Likert scale (Job et al., 2017). These measures had all been shown as reliable in previous experimentation. These studies showed that, when made by “people using machines”, objects were more valued than if made by “machines run by people”; this is in keeping with the law of contagion, as the essence and value transfer would be much higher in the first case, when the objects were actually handled by people (Job et al., 2017). Additionally, perception of social attention was also found to be effective at increasing valuation, meaning that if participants thought others had previously thought about or attended to the object, they would value the object more. However, while researchers found that positive social qualities--friendliness or warmth, for example-- had an effect on valuation, they did not experiment on whether negative social qualities might as well.

The fact that unknown individuals cause this essence transfer and increased valuation, just as well-known individuals do, is crucial. It shows that some increased value is bestowed upon an object by virtue of others deliberately, consciously attending to it. This means that the increased value does not come from the object being associated with someone famous, but that that increased value has something to do with the human mind itself (Job et al., 2017). The next logical step from here is to test if this value of the human mind results in a one-time increase in value, or if the value increases with the number of people who have previously handled an object. We previously examined this phenomenon deeper in a pilot study, where we investigated if participants’ value for an object increased with its number of social connections (Yoo, 2017). Our pilot study had a small sample size, $n = 45$, but promising results, as objects with a higher number of social connections showed a significant increase in value. Part of this current study is a repetition of our pilot study but with a larger sample size, to test for replicability and reliability.

Some form of value, then, can be attributed to the realization that other humans have simply attended to this object. This ties into theory of mind, the awareness that one has beliefs and desires, and the awareness that others have individual beliefs and desires that are different from his or her own, and is an important stage in early childhood development. Theory of mind allows for the realization of an "intersubjective reality" shared by human groups, organized by shared experiences and individual interpretation of said experiences (Fonagy, Gergely, & Jurist, 2004). According to Echterhoff, Higgens, and Levine (2009), this intersubjective reality is a fundamental need of human groups, in which we experience more than just others' "observable behaviors", also experiencing a "successful connection to other people's inner states." The added value an object obtains through its social connection stems from, not just knowing others have handled it and attended to it, but what that means-- that others have shared these thoughts, feelings, and reflections about the object, an intersubjective reality that the individual is now joining.

All of this stipulates that the valuation an object undergoes when it has a social connection is because that social connection means others have consciously attended to that object. As the theory of contagion suggests, when each person handles an object, some of his or her intrinsic value rubs off on that object. If the next person to handle that object knows it was previously attended to, then it makes sense that he or she would view that object more highly.

Furthermore, if when one handles an object, he or she considers everyone who has handled it before, does the way in which it was previously handled matter? For example, if a person knows that everyone who handled the object before did so in a passing or careless manner, this may result in less rubbed off contagion, and therefore less value, than might be seen if the object was previously handled with an evaluative or careful manner. There is a possibility

that conscious and deliberate attention to an object may result in more rubbed off contagion than undeliberate handling.

This current study focuses on two different parts of this valuation process. The first question the study asks is centered around whether or not social connections are quantifiable: that is, if an object's valuation increases the more social connections it has, or if there is no distinction between having one social connection or, for example, a hundred. The second question the study asks focuses on the valuation process: specifically, if the type of attention people have previously given to an object affects how one presently values it. Concerning the first question, we hypothesize that the more social connections an objet has, the higher its value will be; concerning the second question, we hypothesize that the consciously evaluating an object increases its perceived value over unconsciously evaluating it. Additionally, if both these hypotheses are supported, we hold a third interaction hypothesis: if both the number of social connections and previous conscious attention increase value, then objects that have a high number of social connections and have previously been consciously attended to will have an especially high value.

Methods

Participants

A total of 251 undergraduate college students participated in this study. Among them, 32 failed to comply with the experimenter's instructions and 3 had their data corrupted due to technical difficulties, and thus were excluded from the final analysis. The remaining 216 participants included 200 students (52 men, 163 women, 1 non-binary) aged 18-21, 3 students aged 22, 1 student aged 23, and 2 students aged 24.

In order to participate in this experiment, subjects had to be 18 years or older and currently enrolled in the University of Tennessee at Knoxville. Before participating in the study, participants were asked to read and sign an Informed Consent Form explaining all pertinent information and were told that they could withdraw from the study at any point without penalty. Upon completion of the experiment, participants received course credit for Introductory Psychology or extra-credit for upper level psychology courses.

Design and Procedures

There were four conditions for this experiment, creating two subsets of manipulation: the participant conditions, and the task conditions. Concerning the task conditions subset, under conditions 1 and 2, participants were told they were evaluating an object, while under conditions 3 and 4, participants were told they were describing an object. Concerning the participant conditions subset, under conditions 1 and 3, participants were told they were the third student to participate, while under conditions 2 and 4, they were told they were the 203rd student to participate. Aside from these two differences in initial instruction, the procedures were identical for each condition.

Figure 1: Experimental Set-Up

	Participant 3	Participant 203
Evaluating	**Condition 1**	**Condition 2**
Describing	**Condition 3**	**Condition 4**

Participants signed up for fifteen minute timeslots, one participant per timeslot. Upon arrival, participants would be given an Informed Consent form to read through and sign. Once

the researcher had received the Informed Consent form back, participants were taken back into the lab to a small cubicle and computer. The same cubicle was used for each participant. The survey would already be pulled up on the computer, a fabricated list of either 2 or 202 participants would already be pinned on the wall adjacent to the participant, and a pen and a "Smokey Buck" – the social object used for this experiment -- would already be placed in front of the participant. The researcher would explain that the participant was going to be given a series of questions about their opinion on the object in front of him or her, and would then ask the participant to sign on the fabricated participant list, with the added comment that he or she was "the 3rd/203rd fellow Vol to participate in this experiment". This was the only difference between conditions concerning the participant conditions subset. After the list was pinned back to the wall and any questions the participant had were answered, the researcher would move across the room with his or her back to the participant, and the experiment would proceed.

All data were collected through the survey software Qualtrics. The survey began with a title page that explained the task that participants were about to do, which differed slightly depending on the condition:

> *Today we will ask you to evaluate* (conditions 1, 2) */describe* (conditions 3, 4) *the Smokey buck. The Smokey buck is a potential new initiative being considered by the University. The students would be able to use Smokey bucks to start an informal economy, where they can use Smokey bucks to pay one another for goods and services.*
>
> *Importantly, Smokey bucks would only be traded among students, and could NOT be used to pay for any University services or products such as purchases in campus dining, the bookstore, or the VolShop.*

If in condition 1 or 2, the evaluation conditions, students would also see this text:

Here at the psychology department we are evaluating whether this initiative would be welcomed by the student body.

If in condition 3 or 4, the description conditions, students would also see this text:

Here at the psychology department we are interested in the visual details (colors, shapes) that can be seen by the students.

After this screen, participants would advance to a writing screen, where they would be given up to ten minutes to type up what they thought about the Smokey Buck's "look, design, shape, color, etc.". If in condition 1 or 2, the evaluation conditions, participants would describe "what they thought" about the Smokey Buck, and were asked to take the time to think carefully about their "opinions"; if in condition 3 or 4, they would be asked to describe "how the Smokey buck looks", and to take the time to think carefully about "what they saw". These instructions, and the instructions on the previous screen, were the only differences between conditions for the task subset.

After the writing screen, participants were given six attitudinal statements (e.g. "It looks good"; "I would use it") on a 7-point Likert scale (1-Strongly disagree; 7-Strongly agree") before proceeding to the next page, which asked students, per "university regulations", to tear the Smokey buck in half. Qualtrics recorded the time participants spent on this page. After the tearing section, participants got another series of six questions on the 7-point Likert scale, these focusing on how guilty they had felt about tearing the Smokey buck (e.g. "I did not like tearing the Smokey buck"; "I was hesitant to tear the Smokey buck"). After this section, participants answered demographic questions about their gender, age, and year before reaching the end of the survey.

Manipulation and Measures

In order to measure the quantifiability of social connection, for the participant condition subset, each participant was randomly placed into either the "3rd" condition, n = 102, or the "203rd" condition, n = 114, which manipulated how many people the participant thought had participated in the experiment before. This meant that in one condition, the social object had very little social connection, while in the other, the social object had a very high social connection.

In order to measure how task affected social connection, for the task condition subset, each participant was randomly placed into either the evaluation condition, n = 112, or the description condition, n = 104, which manipulated the task the participant was presented with concerning the social object. In the description condition, participants were asked to merely describe the physical attributes of the object, while in the evaluation condition, participants were asked to reflect on the object and consider its quality and value.

Both of these variables were measured by how long participants took to tear up the Smokey Buck. Job et al.'s research (2017) showed this was a valid measure by which to examine how much a participant valued an object. The time spent on the page instructing participants to tear up the Smokey buck was measured, in seconds, by the computer; these were the only instructions on the page, with participants asked to press continue after they had torn up the Smokey buck.

While each participant, of course, had a new Smokey buck, meaning it was not the exact same object handled by all participants, the law of similarity indicates that each copy of the Smokey buck should retain the same social connections and value (Rozin, Millman, & Nemeroff, 1986). Therefore, we reasoned that, while each participant handled and attended to their own Smokey buck, the contagion effect would generalize to the object across trials.

Results

All data collected from the survey were transferred in the statistical software SPSS for the final analysis.

The responses concerning what the students thought about the Smokey Buck, the first set of six altitudinal questions, were aggregated to give one data point for each participant representing how positively that participant thought about the Smokey buck. The data for these questions have a Cronbach's alpha value of .916, indicating that these six questions were able to be aggregated together reliably and accurately. This data was then analyzed across conditions (see Figure 2): F(1, 212), participant conditions = 1.004, p = .159; task conditions = .957, p = .165. This shows that there was no significant change in how much participants liked the Smokey Buck across conditions.

Figure 2: "Like It" data analysis

Condition	**F**	**Significance**
Task	0.957	0.165
Participant	1.004	0.159

The responses concerning how guilty the students felt about tearing the Smokey Buck, the second set of six altitudinal questions, were treated similarly, aggregated together to give one data point representing how guilty the participants felt about tearing the Smokey Buck. The responses for questions five and six were reversed beforehand, as the scale had been switched: for questions one through four, the higher the numerical response, the guiltier the participant felt, but for questions fix and six, the lower the numerical response, the guiltier the participant felt. The data for these questions have a Cronbach's alpha value of .867, indicating that these six questions were able to be aggregated together reliably and accurately. This data was then

analyzed across conditions (see Figure 3): F(1,212), participant conditions = 1.874, p = .086; task conditions = .533, p = .233. This shows that there was no significant change in how guilty participants felt about tearing the Smokey Buck across conditions; however, there is a possible trend for the participant conditions, in which participants in the 203rd condition felt guiltier than participants in the 3rd participant condition.

Figure 3: "Hesitation" data analysis

Condition	F	Significance
Task	0.533	0.233
Participant	1.874	0.086

Tearing time was also measured against the aggregate data for these questions assessing guilt for correlation: Pearson correlation .163, p = .0085.

The tearing time participants took to tear up the Smokey Buck was measured and analyzed across conditions (see Figures 4, 5, 6): F(1,212), participant condition = 3.119, p = .04; task condition = .188, p = .33. This shows that there was a significant increase in tearing time across the participant number conditions, but no significant change across the task conditions. Concerning our interaction hypothesis, tearing time was also measured across all four conditions: F(1,212), .207, p = .325.

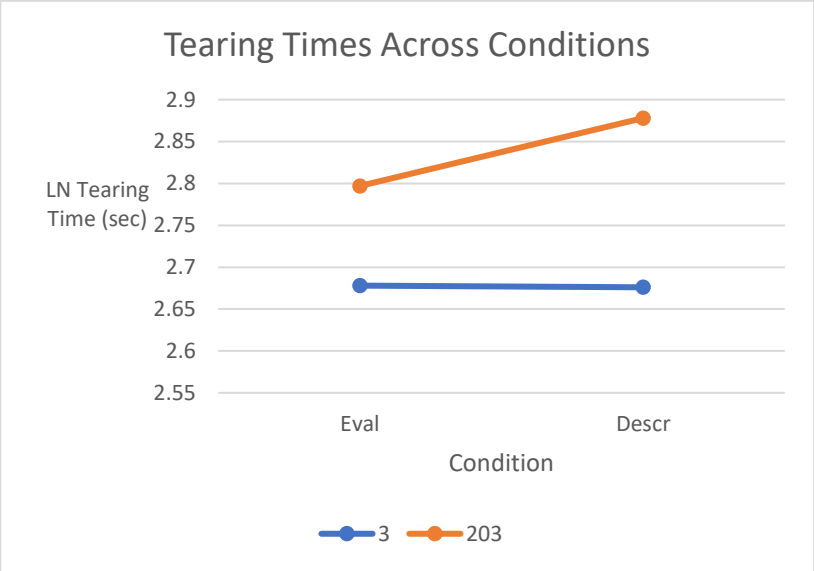
Figure 4: Tearing Time Data

Condition		N	Mean (sec)	Std. Error	95% Confidence Interval
Evaluation:	3 (cond1)	52	2.678	0.093	2.495-2.860
	203 (cond2)	60	2.797	0.086	2.627-2.967
Description:	3 (cond3)	50	2.676	0.094	2.490-2.862
	203 (cond4)	54	2.878	0.091	2.699-3.058

Figure 5: Tearing Time data analysis (=significance)*

Condition	F	Significance
Task	0.188	0.333
Participant	3.119	0.04*

Figure 6: Tearing Time Across Conditions



While participants were specifically instructed to "tear the Smokey Buck in half", multiple participants tore the Smokey Buck into many more pieces. The number of pieces the Smokey Buck had been torn into was analyzed across conditions. No significant relationship was found.

Discussion

As seen in the analysis for the hesitation data, there was a strong correlation between how guilty participants felt, and how long it took for them to tear the buck. As previously shown by Job et al.'s (2017) findings, hesitation over destroying an object is an accurate measure of how much one values said object. While the results were not significant here, a strong trend was seen

($p = .086$), suggesting this is an accurate way to measure valuation. How much a student actually reported liking the Smokey Buck, however, did not significantly correlate with tearing times, or how much the student valued the object. What causes this discrepancy is not clear. As the questions directly assessing how much students liked the object came before they destroyed it, but the questions assessing their guilt came after it, perhaps there is something about the act of destruction that deepens the student's connection to the object.

These results showed that there was a significant increase in tearing time over the participant conditions, with subjects in the 203 conditions taking longer to tear the Smokey Buck than participants in the 3 conditions. There was no significant change, however, in tearing time over the task conditions, meaning the type of task the participant was given concerning the Smokey Buck did not affect its valuation or social connection. This supports our hypothesis that the valuation of a social connection is quantifiable: when the participant perceived more people as having handled the object, he or she also showed increased valuation for the object. This did not, however, support our hypothesis that the evaluation task would result in increased valuation, as there was no increase in tearing time for either task. As our second hypothesis was not supported, we did not have sufficient evidence to support our interaction hypothesis.

The increase in valuation evidenced by the participant conditions suggests that the social connection gained from a source individual is additive, and that there is a distinction made in our minds between one person's attention to an object and a hundred's. While the law of contagion describes how a person's essence can be transferred to an object, this data shows that we subconsciously take into account just how many people have previously handled that object in how we value that object.

Of equal note, however, is that the task did not result in a change in valuation or tearing

time. For one task, participants were specifically asked to evaluate and form opinions about the quality of the Smokey Buck; for the other, they were only asked to describe the physical attributes of the Smokey Buck. While participants consciously ascribed a value to the object in the evaluation conditions, this did not seem to have an effect on tearing time or valuation. This seems to suggest that the valuation process is the same whether it is done consciously or unconsciously, which is unexpected. It also suggests that our perception of how people have previously handled an object, consciously and deliberately versus somewhat carelessly, does not affect the amount of contagion rubbed off on it. Thus, there is a possibility that the mechanisms underlying valuation are all unconscious ones, and do not depend on conscious attention or valuation.

There are several problems with this study that could be corrected in future studies. First and foremost was an issue with the methodology that affected data collection: on the screen that instructed participants to tear the Smokey Buck, many participants were uncertain and asked the researcher for clarification, greatly inflating their tearing time by five seconds or more. There were also many participants who did not tear the Smokey Buck at all until after they had advanced to the next screen, producing a fraudulent data point. While these data points were primarily excluded, it was difficult for the researcher to observe every participant close enough to note every occurrence of these instances. This resulted in a very small minority of data points that were fraudulent. In the future, the study's instructions should be clarified somehow, to reduce the frequency of such occurrences and improve the quality of the data.

Future studies could also focus on group membership and how this affects valuation. While participants were told they were the "3rd/203rd fellow Vol" to participate, were given an orange pen with which to sign the sheet with, and handled the Smokey Buck as an object, there

could be many more measures taken to reinforce a participant's membership to the "Vol" group. This could have an effect on valuation in several ways. For example, simply, the Smokey Buck is clearly associated with Vols, with its orange and white color scheme and the imagery of the mascot, so reinforcement of a participant's membership to that group could increase valuation of the object. Another way this could affect valuation focuses more on the law of contagion: by identifying all other previous study participants as Vols, the current participant's shared reality with them may be strengthened. Sharing commonalities with previous study participants may increase the essence that they had transferred to the object, thereby increasing valuation.

Overall, this experiment shows that the shared reality created by attending to a social object has a quantifiable, significant effect on how greatly that object is valued, and that the more people join this shared reality, the greater this affect is. It supports the law of similarity, as every trial of the experiment relied on the social connections of one object being transferred to a replication of it, and examines the implications of the law of contagion by exploring how social connection and essence transfers can be additive. Future experimentation into the law of contagion's underlying mechanisms must still be done in order to further clarify the valuation process and how it is affected by social connections.

References

Argo J. J., Dahl D. W., Morales A. C. (2006). Consumer contamination: How consumers react to products touched by others. *Journal of Marketing, 70,* 81-94.

Echterhoff, G., Higgins, E. T., & Levine, J. M. (2009). Shared reality: Experiencing commonality with others' inner states about the world. *Perspectives on Psychological Science, 4*, 496-521.

Fonagy, P., Gergely, G., & Jurist, E. L. (Eds.). (2004). *Affect regulation, mentalization and the development of the self*. Karnac books.

Frazcr, J. G. (1959). *The new golden bough: A study in magic and religion* (abridged). New York: Macmillan (Edited by T. H. Caster, 1922; Original work published 1890).

Gelman S. A., Manczak E. M., Noles N. S. (2012). The nonobvious basis of ownership: Preschool children trace the history and value of owned objects. *Child Development, 83*, 1732-1747.

Gelman S. A., Manczak E. M., Was A. M., Noles N. S. (2016). Children seek historical traces of owned objects. *Child Development, 87*, 239-255.

Gelman S. A., Noles N. S., Stilwell S. (2014). Tracking the actions and possessions of agents. *Topics in Cognitive Science, 6,* 599-614.

Hall, G. (1994). Pavlovian conditioning: Laws of association. *Handbook of perception and cognition series, 2,* 15-43.

Job, V., Nikitin, J., Zhang, S. X., Carr, P. B., & Walton, G. M. (2017). Social traces of generic humans increase the value of everyday objects. *Personality and Social Psychology Bulletin, 43,* 785-792.

Master A., Walton G. M. (2013). Membership in a minimal group increases motivation and learning in young children. *Child Development, 84,* 737-751.

Mauss, M. (1972). *A general theory of magic*. (Robert Brain, Trans.). New York: W. W. Norton. (Original work published 1902).

Nemeroff C., Rozin P. (1994). The contagion concept in adult thinking in the United States: Transmission of germs and interpersonal influence. *Ethos, 22,* 158-186.

Newman G. E., Diesendruck G., Bloom P. (2011). Celebrity contagion and the value of objects. *Journal of Consumer Research, 38,* 215-228.

Newman, G. E., & Smith, R. K. (2016). The need to belong motivates demand for authentic objects. *Cognition, 156,* 129-134.

Rozin P., Millman L., Nemeroff C. (1986). Operation of the laws of sympathetic magic in disgust and other domains. *Journal of Personality and Social Psychology, 50,* 703-712

Rozin, P., Nemeroff, C., Wane, M., Sherrod, A. (1989). Operation of the sympathetic magical law of contagion in interpersonal attitudes among Americans. *Bulletin of the Psychonomic Society, 27,* 367-370.

Tylor, E. B. (1871). *Primitive Culture: Researches into the development of mythology, philosophy, religion, art, and custom*. New York: Gordon Press.

Yoo, S. J. (2017). *The Value of an Object's Social Connection.* Unpublished manuscript.